AMENDMENTS TO THE CLAIMS

Claim 1 (Currently amended) An extrusion-free wet cleaning process for post-etch Cu-dual damascene structures, the process comprising:

providing a wafer comprising a silicon substrate and at least one post-etch Cu-dual damascene structure, the post-etch Cu-dual damascene structure having a via structure exposing a portion of a Cu wiring line electrically connected with an N^+ diffusion region of the silicon substrate and a trench structure formed on the via structure;

executing an oxidation step by applying a diluted H_2O_2 solution to the wafer to slightly oxidize the surface of the exposed Cu wiring line; and

washing away cupric oxide generated in the oxidation step by means of a cupric oxide cleaning solution containing diluted HF, NH_4F or NH_2OH having a pH of above 7.; ~~and~~

~~preventing Cu reduction reactions on the N^+ diffusion region connected Cu wiring line.~~

Claim 2 (Original) The process of claim 1 wherein the Cu wiring line electrically connected with an N^+ diffusion region of the silicon substrate serves as a cathode in the cupric oxide cleaning solution.

Claim 3 (Original) The process of claim 1 wherein the method of preventing Cu reduction reactions on the Cu wiring line comprises purging inert gas onto the wafer during the application to the wafer of the diluted H_2O_2 solution.

Claim 4 (Original) The process of claim 1 wherein the method of preventing Cu reduction reactions on the Cu wiring line comprises adding a Cu corrosion inhibitor to the diluted H_2O_2 solution.

Claim 5 (Original) The process of claim 4 wherein the Cu corrosion inhibitor comprises benzotriazole (BTA).

Claim 6 (Currently amended) The process of claim 1 wherein the method of preventing Cu reduction reactions on the Cu wiring line comprises reducing the H_2O_2 concentration of the diluted H_2O_2 solution to below 100:1 (v/v) of solvent to H_2O_2.

Claim 7 (Original) The process of claim 1 wherein the method of preventing Cu reduction reactions on the Cu wiring line comprises lowering the temperature of the diluted H_2O_2 solution to below 15℃ during the application to the wafer of the diluted H_2O_2 solution.

Claim 8 (Cancelled)

Claim 9 (Currently amended) A wet cleaning process comprising:

an oxidation step comprising a means for reducing Cu deposition on a cathode-like copper wiring line of a Cu-dual damascene structure, wherein the means for reducing Cu deposition on a cathode-like copper wiring line comprises a step of purging an inert gas during the oxidation process; and

an oxide etch step for washing away cupric oxide generated in the oxidation step by means of a cupric oxide cleaning solution.; ~~and~~

~~reducing Cu deposition on a cathode-like copper wiring line of a Cu-dual damascene structure.~~

Claim 10 (Original) The process of claim 9 wherein the oxidation step is used to slightly oxidize a surface of a Cu wiring line in a dual damascene structure by utilizing a diluted H_2O_2 solution.

Claim 11 (Original) The process of claim 9 wherein the cupric oxide cleaning solution comprises diluted HF, NH_4F, NH_2OH, or diluted HF/HCl.

Claim 12 (Original) The process of claim 9 wherein the oxide generated in the oxidation step comprises CuO_x and $Cu(OH)_2$.

Claim 13 (Original) The process of claim 9 wherein the cathode-like copper wiring line is electrically connected with an N^+ diffusion region of a silicon substrate.

Claim 14 (Cancelled)

Claim 15 (Original) The process of claim 9 wherein the process of reducing Cu deposition on a cathode-like copper wiring line comprises adding a Cu corrosion inhibitor to the diluted H_2O_2 solution.

Claim 16 (Original) The process of claim 15 wherein the Cu corrosion inhibitor comprises benzotriazole (BTA).

Claim 17 (Currently amended) The process of claim 9 wherein the process of reducing Cu deposition on a cathode-like copper wiring line comprises reducing the H_2O_2 concentration of the diluted H_2O_2 solution to below 100:1 (v/v) of solvent to H_2O_2.

Claim 18 (Original) The process of claim 9 wherein the process of reducing Cu deposition on a cathode-like copper wiring line comprises lowering the temperature of the diluted H_2O_2 solution during the oxidation step to below 15℃.

Claim 19 (Original) The process of claim 9 wherein the process of reducing Cu deposition on a cathode-like copper wiring line comprises increasing the pH of the cupric oxide cleaning solution to above 7.